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SPECIFICATION FOR CANTHAXANTHINE, FOOD GRADE

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AMENDMENT NO. 1 MARCH 2005
TO
IS 6405 : 1971 SPECIFICATION FOR CANTHAXANTHINE, FOOD GRADE

(*Page* 4, *Table* 1) — Substitute the following for the existing table:

Table 1 Requirements for Canthaxanthine, Food Grade
(*Clause* 2.4)

Sl No.	Characteristic	Requirement	Method of Test	
			Ref to Appendix	Ref to Cl of IS 1699 : 1995
(1)	(2)	(3)	(4)	(5)
i)	Purity, as $C_{40}H_{52}O_2$, percent by mass, *Min*	96	A	—
ii)	Sulphated ash, percent by mass, *Max*	0.1	B	—
iii)	Subsidiary colouring matter, percent by mass, *Max*	5	C	—
iv)	Arsenic (as As), mg/kg, *Max*	3	—	15
v)	Lead (as Pb), mg/kg, *Max*	2	—	15

*Methods of sampling and test for food colours (*second revision*).

(*Page* 7, *Appendix* B) — Insert 'Appendix C' after 'Appendix B' as under:

APPENDIX C

[*Table* 1, *Item* (iii)]

DETERMINATION OF SUBSIDIARY COLOURING MATTERS

C-1 PROCEDURE

C-1.1 Dissolve about 80 mg of sample in 100 ml chloroform. Apply 400 µl of this solution as a streak 2 cm from the bottom of a TLC plate (Silica gel 0.25 mm). Immediately develop the chromatogram with a solvent mixture of 95 parts dichloromethane and 5 parts diethyl ether in a saturated chamber, suitably protected from light, until the solvent front has moved 15 cm above the initial streak. Remove the plate, allow the main part of the solvent to evaporate at room temperature and mark the principal band as well as the bands corresponding to other carotenoids. Remove the silica gel adsorbent that contains the principal band, transfer it to a glass stoppered 100 ml centrifuge tube and add 40.0 ml chloroform (Solution 1). Remove the silica gel adsorbent that contains the combined bands corresponding to the other carotenoids, transfer it to a glass stoppered, 50 ml centrifuge tube and add 20.0 ml chloroform (Solution 2). Shake the centrifuge tubes by mechanical means for 10 min and centrifuge for 5 min. Dilute 10.0 ml of Solution 1 to 50.0 ml with chloroform (Solution 3).

C-1.2 Determine, with a suitable spectrophotometer, the absorbances of Solutions 2 and 3 in 1 cm cells at the wavelength maximum about 485 nm, using chloroform as blank.

C-2 CALCULATION

C-2.1 Carotenoids other than canthaxanthine, percent $= \dfrac{A_2 \times 100}{10A_3 + A_2}$

where

A_2 = absorbance of Solution 2, and

A_3 = absorbance of Solution 3.

(FAD 8)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR CANTHAXANTHINE, FOOD GRADE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 December 1971, after the draft finalized by the Food Additives Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 This standard is one of the series of Indian Standards on natural food colours permitted under the Prevention of Food Adulteration Rules, 1955.

0.3 In preparing this standard, considerable assistance has been derived from the Specification for identity and purity and toxicological evaluation of food colours, Report Series No. 38 B, published by FAO/WHO, Rome, 1966.

0.4 Description

0.4.1 *Common Name* — Canthaxanthine.

0.4.2 *Colour* — Orange to red in oils and organic solvents.

0.4.3 *Class* — Carotenoid.

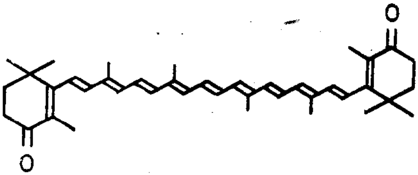
0.4.4 *Colour Index* — DGF Lebensmittel — Orange 79. EEC No. E 1619.

0.4.5 *Chemical Name* — Trans — Canthaxanthine.

0.4.6 *Empirical Formula* — $C_{40}H_{52}O_2$.

0.4.7 *Molecular Weight* — 564·86.

0.4.8 *Structural Formula* —



0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes requirements and methods of test for canthaxanthine, food grade.

2. REQUIREMENTS

2.1 General — Canthaxanthine shall be deep violet crystals. The material for commerce may be solutions in oil, fat or organic solvents or water-dispersible forms, such as powders, granules or capsules, and shall be orange to red in colour.

2.2 Solubility — It is insoluble in water and ethanol and is slightly soluble (about 0·005 percent) in vegetable oils. It is soluble in chloroform.

2.3 Identification Test

2.3.1 *Melting Range* — The melting range shall be about 210°C with decomposition.

2.3.2 *Absorption* — In solution in cyclohexane the absorbance maximum shall be at 470 nm.

2.3.3 The colour of the solution of canthaxanthine in acetone disappears after the successive additions of a 5 percent solution of sodium nitrite and 1 N sulphuric acid.

2.3.4 A solution of canthaxanthine in chloroform turns blue on addition of excess of antimony trichlorine (Carr-Price) reagent.

2.4 The material shall also conform to the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR CANTHAXANTHINE, FOOD GRADE

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST	
			Ref to Appendix	Ref to Cl of IS: 1699 (Part I)-1960*
(1)	(2)	(3)	(4)	(5)
i)	Purity, as $C_{40}H_{52}O_2$, percent by weight, *Min*	96	A	—
ii)	Sulphated ash, percent by weight, *Max*	0·1	B	—
iii)	Arsenic (as As), mg/kg, *Max*	3	—	8
iv)	Lead (as Pb), mg/kg, *Max*	10	—	9

*Method of sampling and test for coal tar food colours, Part I.

---

*Rules for rounding off numerical values (*revised*).

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in air-tight containers filled with nitrogen.

3.2 Marking — Each container shall be marked with the following:

a) Name of the material,
b) Name and address of the manufacturer,
c) Net weight, and
d) Batch or code number.

3.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in Appendix B of IS:3841-1966*.

5. TESTS

5.1 Tests shall be carried out as prescribed in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070 - 1960 †) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF PURITY

A-1. REAGENTS

A-1.1 Chloroform — shall be purified as follows:

Wash the chloroform thrice with 10 percent aqueous solution of sodium thiosulphate in a separatory funnel. Dry the chloroform with anhydrous calcium chloride and filter. Distil the chloroform over anhydrous sodium thiosulphate in all glass apparatus with a fractionating column of 70 cm length. Collect only middle fraction of the distillate, discarding the first 10 percent and last 10 percent.

---

*Specification for β-carotene.

†Specification for water, distilled quality (*revised*).

A-1.2 Cyclohexane — pure.

A-1.3 Alcohol — absolute.

A-2. PROCEDURE

A-2.1 Procedure shall be the same as given in Appendix A of IS : 6386-1971* with the following exceptions.

A-2.1.1 The assay should be carried out rapidly, avoiding exposure to air and light. Weigh accurately about 90 mg into a 100-ml volumetric flask and dissolve in 20 ml of pure chloroform by swirling. Check the solution by its transparency against a bright surface; if necessary, complete the dissolution by allowing to stand for a short while. Dilute to volume with pure cyclohexane. Pipette 5·0 ml of this solution into a 100-ml volumetric flask and dilute to volume with cyclohexane. Dilute 5·0 ml of this solution in the same manner to 100·0 ml. Measure the absorbance of this solution with a spectrophotometer at the maximum (approx 470 nm) in 1 cm quartz cells against cyclohexane as a blank. Calculate with E (1 percent, 1 cm) = 2 200.

A-2.1.2 *Modified Method for Water-Dispersible Materials* — Weigh accurately about 120 mg of the substance into a stout walled test-tube. Add 10 ml of distilled water, flush thoroughly with nitrogen, and heat the test-tube in a water-bath at 60°C, occasionally stirring with a glass rod. Care shall be taken that the powder is thoroughly wetted and that no particles remain adhering to the glass wall of the test-tube. After approximately 10 minutes complete emulsion of the powder should be obtained. Transfer the contents of the test-tube into a 250-ml volumetric flask and add 100 ml of absolute alcohol; use part of the alcohol also to rinse the glass rod and the test-tube. Add 100 ml of chloroform, rinsing the glass rod and test-tube again, shake vigorously, dilute to volume with chloroform, and mix well. Filter part of the solution and immediately pipette 5·0 ml of the clear filtrate into a round bottom flask. Flush with nitrogen and evaporate in a rotary evaporator at about 50°C to dryness. Moisten the residue with a few drops of absolute alcohol, add 50 ml of pure cyclohexane and completely dissolve by heating for a short time in a water-bath at 50°C. Transfer the solution quantitatively into a 100-ml volumetric flask, cool to room temperature and dilute to volume with cyclohexane. With a spectrophotometer, measure the extinction of the maximum at about 470 nm against cyclohexane at a blank, using 1-cm cells. Complete the determination promptly, avoiding exposure to air as far as possible and undertaking all operations in the absence of daylight.

---

*Specification for beta-apo-8′-carotenal, food grade.

A-3. CALCULATION

A-3.1 Calculate the content on the basis of

$$E\,(1 \text{ percent, } 1 \text{ cm}) = 1970 \;(\textit{see} \text{ Note}).$$

NOTE — Dry canthaxanthine 10 percent water-soluble contains a mixture of cis-trans-isomers with the transform as the main component. 1970 is the theoretical [E (1 percent, 1 cm)] value corresponding to the ratio of isomers normally present in the products.

APPENDIX B

[*Table* 1, *Item* (ii)]

DETERMINATION OF SULPHATED ASH

B-1. PROCEDURE

B-1.1 Weigh accurately 1·000 to 2·000 g of the material in a tared crucible. Ignite until thoroughly charred. Cool, then moisten the residue with one millilitre of sulphuric acid, and cautiously ignite until carbon is completely consumed. Conduct the ignition in a place protected from air currents, and use as low a temperature as possible to effect the combusion of the carbon. When the carbon has disappeared completely, cool the crucible in a desiccator and weigh. Note the weight as ash.

INDIAN STANDARDS ON Food Additives

IS :	
1694-1960	Tartrazine
1695-1960	Sunset yellow FCF
1696-1960	Amaranth
1697-1960	Erythrosine
1698-1960	Indigo carmine
1699 (Part I)-1960	Methods of sampling and test for coal tar food colours, Part I
1699 (Part II)-1960	Methods of sampling and test for coal tar food colours, Part II
2557-1963	Annatto colour for food products
2558-1963	Ponceau 4R
2923-1964	Carmoisine
2924-1963	Fast red E
3827-1966	Riboflavin
3841-1966	β-Carotene
4446-1967	Chlorophyll
4447-1967	Sodium benzoate, food grade
4448-1967	Benzoic acid, food grade
4467-1967	Caramel
4750-1968	Sorbitol, food grade
4751-1968	Potassium metabisulphite, food grade
4752-1968	Sodium metabisulphite, food grade
4753-1968	Potassium nitrate, food grade
4818-1968	Sorbic acid, food grade
5055-1969	Lecithin, food grade
5056-1969	Common names for coal tar food colours
5057-1969	Potassium nitrite, food grade
5058-1969	Sodium citrate, food grade
5191-1969	Sodium alginate, food grade
5306-1969	Sodium carboxymethyl cellulose, food grade
5342-1969	Ascorbic acid, food grade
5343-1969	Butylated hydroxyanisole, food grade
5344-1969	Butylated hydroxytoluene, food grade
5345-1969	Sodium saccharin, food grade
5346-1969	Coal tar food colour preparations
5707-1970	Agar, food grade
5708-1970	Sodium tartrate, food grade
5709-1970	Calcium saccharin, food grade
5719-1970	Gelatin, food grade
6022-1971	Fast green FCF, food grade
6029-1971	Wool green BS, food grade
6030-1971	Sodium propionate, food grade
6031-1971	Calcium propionate, food grade
6120-1971	Method of test of total dye content in food colour preparations

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